Career & Technical Education

Program of Studies

Implementation Manual

Revised
December 2001

Course Models

Kentucky Department of Education
Career & Technical Education

AGRICULTURAL EDUCATION

Course Title	Recommended Grade Level						Recommended Credit ***
	7	8	9	10	11	12	
Agri-Biology ****			x	x	x	x	1
Agriscience Exploration	x	x					NA
Principles of Agr Sci & Tech		x	x				1
Agriscience				x	x		1
Animal Science				x	x		1
Equine Science					x	x	1
Animal Technology *					x	x	1
Adv. Animal Science **						x	1
Plant and Land Science				x	x		1
Crop Technology *					x	x	1
Adv. Plant Science **						x	1
Small Power & Equip				x	x	x	1
Agri. Construction Skills *				x	x	x	1
Agri. Structures & Design				x	x	x	1
Agriculture Power and Machinery Operation *				x	x	x	1
Floriculture & Floral Design *				x	x	x	1
Greenhouse Technology *				x	x	x	1
Landscape and Turf Management*				x	x	x	1
Nursery & Orchard Tech.*				x	x	x	1
Agri. Bus/Farm Mgmt *				x	x	x	1
Agri. Employability Skills				x	x	x	1
Agri. Sales & Marketing				x	x	x	1
Agri. Bio-Technology					x	x	1
Agri. Communication				x	x	x	1
Aquaculture				x	x	x	1
Environmental Tech.				x	x	x	1
Food Technology				x	x	x	1
Forestry				x	x	x	1
Small Animal Tech. *				x	x	x	1
Wildlife Resources				x	x	x	1
Adv. Wildlife Mgmt. **						x	1

*These courses may be offered for additional units of credit providing the course content material in each section of the course is different.

**These courses may provide college credit when all course guidelines are met. Instruction provided over KET and coordinated by the local agriculture instructor.

***All courses may be offered for less than one credit based on the local school schedule.

****Interdisciplinary course that meets the life science requirement for science credit.

AGRICULTURAL SCIENCE AND TECHNOLOGY OVERVIEW

Agricultural Science and Technology Education is designed to provide career exploration, orientation, and preparation for those students who have an interest in some aspect of agriculture. The knowledge and performance skills required for successful achievement and/or advancement in agricultural occupations constitute the central focus of the program. Students planning to attend college majoring in any field of agriculture or science would benefit from high school agricultural education.

The agricultural industry has many related occupational fields. Farming is no longer agriculture's primary occupation. Currently about 20 percent of all occupations are agriculturally related. Therefore, it is necessary to provide educational opportunities to students within this rapidly growing occupational field.

Each local Agricultural Education Program should offer courses that meet the needs of students and the local agriculture industry. It is recommended that courses be offered in various agricultural areas to provide students an opportunity to explore the various fields of agriculture and develop skills within these areas.

The Agricultural Education career cluster area contains 5 Career Majors. The 5 career majors are: Production, Horticulture, Agribusiness, Agricultural Mechanics/Engineering and Forestry/Resource Management. Students choosing to concentrate in Agricultural Education should select one of the 5 majors. This major should be listed on their Individual Graduation Plan. They also should be identified on the CATS Assessment as a "Career Major" concentrator in that same major area.

Principles of Agricultural Science and Technology is recommended as the first course students should enroll in as ninth graders; however, it is not required as a prerequisite to enrollment in other agricultural courses.

Students are encouraged to participate in cooperative education and other work-based learning experiences. Cooperative Education consists of in-school instruction combined with on-the-job work experience. Specific guidelines are outlined in 705 KAR 4:041. Information on other types of work-based learning are described in detail in the document Work-Based Learning Guide 2000, which is available on the KDE web page at:
www.kde.state.ky.us/careerandtechnicaleducation/resourcesandpublications

All courses consist of classroom instruction, related laboratory experiences, and supervised agricultural experience programs (entrepreneur or cooperative on-the-job placement, or other placement experiences). Each student enrolled must plan an agricultural experience program that complements the classroom instruction. Time shall be provided in the daily teaching schedule for both classroom instruction and supervision of experience programs. In addition to the general guidelines a Supervised Agriculture Experience (SAE) program can be assessed as an Entrepreneurship work-based experience.

FFA is the career and technical student organization available to students enrolled in agricultural education programs. The activities of the organization are an integral part of the instructional program. All students enrolled are encouraged to become members of the FFA and take advantage of the leadership, citizenship, and personal development training offered.

Each approved Agricultural Education Program shall have an active FFA chapter that provides leadership development opportunities for all its members. Agricultural education teachers shall serve as FFA chapter Advisors.

AGRICULTURAL CAREER CLUSTERS

CAREER MAJORS

Agribusiness	Horticulture	Production
Agriscience Exploration (7th-8thGrade) - (no credit toward career major)		
Recommended Courses	Recommended Courses	Recommended Courses
Principles of Agricultural Science and Technology Agriscience Ag. Business/Farm Mgmt. Ag. Employability Skills Ag. Sales & Marketing Agriculture Bio-Technology Equine Science Greenhouse Technology Aquaculture Agricultural Communications Environmental Technology Food Technology Animal Technology	Principles of Ag. Science & Tech. Agriscience Plant/Land Science Floriculture/Floral Design Greenhouse Technology Nursery /Orchard Technology Landscaping/Turf Mgmt Adv. Plant Science Ag. Business/Farm Mgmt Ag. Construction Skills Ag. Employability Skills Ag. Sales and Marketing Ag. Structures & Designs Small Power Equipment Environmental Technology Agricultural Bio-Technology Agri-Biology	Principles of Ag. Science & Tech. Agriscience Animal Science Plant & Land Science Animal Technology Crop Technology Equine Science Ag. Business/Farm Mgmt Adv. Animal Science Adv. Plant Science Agriculture Bio-Technology Aquaculture Ag. Employability Skills Ag. Sales and Marketing Ag. Construction Skills Small Power Equipment Ag. Power & Machinery Operation Ag. Structures & Designs Greenhouse Technology Small Animal Technology Agri- Biology Agricultural Bio-Technology
Elective Courses	Elective Courses	Elective Courses
• Leadership Dynamics • Computer Applications • Business Management • Marketing Management * Other Career and Technical Education Courses	• Leadership Dynamics • Computer Applications • Business Management • Marketing Management * Other Career and Technical Education Courses	• Leadership Dynamics • Computer Applications • Business Management • Marketing Management * Other Career and Technical Education Courses

- Other Career and Technical Education courses directly related to the student's Career Major.

AGRICULTURAL CAREER CLUSTERS

CAREER MAJORS - Continued

Agricultural Mechanics/ Engineering	**Forestry/Resource Management**
Agriscience Exploration (7th-8th Grade) – (no credit toward career major)	
Recommended Courses	Recommended Courses
Principles of Ag. Science and Technology Agriscience Ag. Construction Skills Small Power Equipment Ag. Power and Machinery Operation Ag. Sales and Marketing Ag. Structures and Designs Ag. Employability Skills Ag. Business/Farm Management Ag. Bio Technology	Principles of Ag. Science and Technology Agriscience Forestry Environmental Technology Wildlife Resources Agricultural Bio-Technology Advanced Wildlife Management Plant & Land Science Ag. Employability Skills Small Power Equipment Agri- Biology
Elective Courses	Elective Courses
• Leadership Dynamics • Computer Applications • Business Management • Marketing Management * Other Career and Technical Education Courses	• Leadership Dynamics • Computer Applications • Business Management • Marketing Management * Other Career and Technical Education Courses

- Other Career and Technical Education courses directly related to the student's Career Major.

To complete a career major, students must earn four career-related credits within the career major. Three of the four credits must come from the recommended courses for that major. Graduates for 2002 and beyond must meet the high school graduation requirements.

NOTE: Agribiology is an interdisciplinary course which meets the graduation requirements for Life Science.

MODEL COURSE SEQUENCE

AGRICULTURAL CAREER CLUSTER			
ACADEMIC CORE			
9TH	**10TH**	**11TH**	**12TH**
English I	English II	English III	English IV
Algebra I	Geometry	Math Elective ←→	Elective
Science	Science	Health & PE	Science
Social Studies	History & Appreciation of Visual & Performing Arts	Social Studies	Social Studies
TECHNICAL CORE			
Principles of Agricultural Science & Technology	Plant & Land Science	Agricultural Construction Skills	Agricultural Employability Skills
	Small Power & Equipment	Agricultural Communications	Agribusiness/Farm Management
	Principles of Agriculture Science & Technology	Crop Technology	Agriculture Power & Machinery

AGRICULTURAL CAREER CLUSTER			
ACADEMIC CORE			
9TH	**10TH**	**11TH**	**12TH**
English I	English II	English III	English IV
Algebra I	Geometry	Math Elective ←→	Elective
Science	Science	Health & PE	Science
Social Studies	History & Appreciation of Visual & Performing Arts	Social Studies	Social Studies
TECHNICAL CORE			
Principles of Agricultural Science & Technology	Agricultural Communications	Agricultural Sales & Marketing	Environmental Technology
	Agriscience	Small Animal Technology	Agricultural Construction Skills
	Principles of Agricultural Science & Technology	Agri-Biology	Aquaculture

MODEL COURSE SEQUENCE

PRODUCTION CAREER MAJOR			
ACADEMIC CORE			
9TH	**10TH**	**11TH**	**12TH**
English I	English II	English III	English IV
Algebra I	Geometry	Math Elective ←→	Elective
Science	Science	Health & PE	Science
Social Studies	History & Appreciation of Visual & Performing Arts	Social Studies	Social Studies
TECHNICAL CORE			
Principles of Agricultural Science & Technology	Plant & Land Science	Animal Science	Agricultural Employability Skills
	Small Power & Equipment	Agri-Biology	Agribusiness/Farm Management
	Agriscience	Crop Technology	Advanced Animal Science
HORTICULTURE CAREER MAJOR			
ACADEMIC CORE			
9TH	**10TH**	**11TH**	**12TH**
English I	English II	English III	English IV
Algebra I	Geometry	Math Elective ←→	Elective
Science	Science	Health & PE	Science
Social Studies	History & Appreciation of Visual & Performing Arts	Social Studies	Social Studies
TECHNICAL CORE			
Principles of Agricultural Science & Technology	Plant and Land Science	Agricultural Sales & Marketing	Environmental Technology
	Agriscience	Greenhouse Technology	Advanced Plant Science
	Small Power and Equipment	Floricultural Floral Design	Landscaping/Turf Management

MODEL COURSE SEQUENCE

AGRIBUSINESS CAREER MAJOR			
ACADEMIC CORE			
9TH	**10TH**	**11TH**	**12TH**
English	English II	English III	English IV
Algebra I	Geometry	Math Elective ←→	Elective
Science	Science	Health & PE	Science
Social Studies	History & Appreciation of Visual & Performing Arts	Social Studies	Social Studies
TECHNICAL CORE			
Principles of Agricultural Science & Technology	Agriscience	Agricultural Communications	Food Technology
	Ag. Employability Skills	Equine Science	Agribusiness/Farm Management
	Ag. Sales and Marketing	Bio-Technology	Animal Technology
AG MECHANICS/ENGINEERING CAREER MAJOR			
ACADEMIC CORE			
9TH	**10TH**	**11TH**	**12TH**
English	English II	English III	English IV
Algebra I	Geometry	Math Elective ←→	Elective
Science	Science	Health & PE	Science
Social Studies	History & Appreciation of Visual & Performing Arts	Social Studies	Social Studies
TECHNICAL CORE			
Principles of Agricultural Science & Technology	Agriscience	Ag Power & Machinery Operation	Ag Business/Farm Management
	Small Power & Equipment	Agricultural Structures & Design	Agricultural Construction Skills
	Ag Bio-Technology	Agriculture Sales & Marketing	Agricultural Employability Skills

MODEL COURSE SEQUENCE

FORESTRY/RESOURCES MANAGEMENT CAREER MAJOR			
ACADEMIC CORE			
9TH	**10TH**	**11TH**	**12TH**
English	English II	English III	English IV
Algebra I	Geometry	Math Elective ←→	Elective
Science	Science	Health & PE	Science
Social Studies	History & Appreciation of Visual & Performing Arts	Social Studies	Social Studies
TECHNICAL CORE			
Principles of Agricultural Science & Technology	Agriscience	Agri-Biology	Environmental Technology
	Wildlife Resources	Forestry	Agricultural Bio-Technology
	Plant and Land Science	Ag Employability Skills	Advanced Wildlife Management

Course Overview:
This one-credit course uses agricultural contexts to present the life science content outlined in the *Program Studies*. As students study practical agricultural concepts, they apply scientific ways of thinking and working to real-life problems. During their study of agri-biology, students perform many practical tasks. They create models, extract DNA, analyze DNA fingerprints, construct tables and graphs to classify and analyze data, and test soils. Students also participate in cooperative and collaborative groups, use technology to solve problems, and participate in field trips to apply scientific concepts to agricultural and environmental problems. Students develop an understanding of many concepts such as cell structure and function, morphology and physiology of agriculturally significant animals, heredity principles and inheritance patterns, genetic engineering, animal behavior, biological change, interdependence of plants and animals, and the flow of matter and energy through ecosystems.

Models are organized around guiding questions. Guiding questions (in bold print) direct teachers' choices of activities and are the questions students should be able to answer at the end of the course. Essential questions may be included to further focus student learning.

Pages of models are arranged in pairs. On the left-hand page of each pair are guiding (in bold print) and essential questions along with related academic expectations and correlation to the and agri-biology content chart. Sample activities and sample extensions for diverse learners are found on the right-hand page. While sample activities address content or content from elective areas, they are not intended to be comprehensive. Teachers still are responsible for planning instruction to meet the diverse needs of all their students.

Guiding and Essential Questions:
How do cell structure, function, and processes affect living things?

What is the molecular basis of heredity?

• How does DNA affect organisms' morphology and physiology?

How do behavioral patterns ensure reproductive process?

• How do agriculturalists manipulate reproductive success?

What are the processes of biological change?

• How do agricultural crops and animals reflect diversity in nature?

How are organisms within ecosystems interdependent?

• How do agricultural processes alter ecosystems?

• How are croplands different from natural ecosystems?

How do organ systems work together to keep animals healthy?

What skills and knowledge must I have to be successful in an agricultural career in Kentucky?

Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale and Models, Constancy, and Change Over Time (2.1 - 2.6)	How do cell structure, function, and processes affect living things?	**Students will** **Life Sciences** • investigate cell structures and their functions. • investigate cell regulation, differentiation, and how the process of photosynthesis provides a vital connection between the Sun and energy needs of living systems. • investigate photosynthesis, cellular respiration, and energy. **Scientific Inquiry** **All scientific inquiry bullets are included in this guiding question.** **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • analyze how science and technology are necessary for solving issues. • recognize that scientific knowledge is subject to change. • investigate advances that have effects on science and society. **Agri-biology Content Chart** • communicate recurring themes and processes of biology and chemistry that are common to all organisms. • relate fundamentals of genetics to organisms' morphology, physiology, and inheritance patterns.

Sample Activities	Sample Extensions for Diverse Learners
Students will • examine slides of various cell types from multicellular organisms. Discuss relationships between structure of different cell types and their functions. Determine common structures and functions of all cells. Create models of plant and animal cells, using biodegradable materials. Label and color code each organelle and describe its function. Identify organelles common to both and unique to each. • compare functions of cell organelles to school or city structures that have similar functions. Create multimedia presentations showing comparisons. • investigate use of microbes to produce substances needed by other plants, animals, and humans (e.g., insulin). Create illustrated flow charts, demonstrating processes. Write editorials, explaining need for increased funding for basic research in microbiology. *Use this activity to develop possible writing portfolio entries (WP - Transactive).* • research use of biotechnology and genetic engineering in development of new livestock breeds, plants, and disease control. Evaluate alternatives to genetic engineering methods. Evaluate impact of genetic engineering on their community and predict short- and long-term consequences. Develop policies that regulate use of genetic engineering. Present findings and recommendations to agricultural extension agents. ***Technology suggestion:*** *Use CD-ROMs, digital cameras, computers, video, and audio to create multimedia presentations for extension agents.* • investigate how and when cells differentiate. Read "How Does a Single Cell Become a Whole Body." Trace formation of germ layers and identify organ systems that develop from each layer. Create informational bulletin boards, collages, or posters to display in classrooms.	

Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale, and Models, Constancy and Change Over Time (2.1 - 2.6)	How do cell structure, function, and processes affect living things?	**Students will** **Life Sciences** • investigate cell structures, and their functions. • investigate cell regulation, differentiation, and how the process of photosynthesis provides a vital connection between the Sun and energy needs of living systems. **Scientific Inquiry** **All scientific inquiry bullets are included in this guiding question.** **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • examine the interaction between science and technology. • analyze how science and technology are necessary for solving issues. • recognize that scientific knowledge is subject to change. • investigate advances that have effects on science and society. **Agri-biology Content Chart** • communicate recurring themes and processes of biology and chemistry that are common to all organisms. • relate fundamentals of genetics to organisms' morphology, physiology, and inheritance patterns.

Sample Activities	Sample Extensions for Diverse Learners
Students will • observe chicken embryos at 24, 48, and 72 hours of development. Record observations throughout incubation period, including humidity, temperature, turning rate, weight, and stage of maturity. Compare in graphic organizers features at different stages. Identify body structures of developing embryos and explain their functions. Investigate factors that interfere with embryonic development. Create multimedia presentations for poultry farmers to explain embryonic development. • investigate prenatal and postnatal growth and development. Compare growth rate of organ systems after animals are born. Write summaries in learning logs, describe growth rates of different organ systems and effect growth rate has on animals.	Julie needs to develop confidence in her ability to contribute positively in class. Her family owns and manages a poultry industry. Julie will arrange for her class to visit and observe the chick incubation and hatching process (*Types of extensions: motivation, participation).*

Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale, and Models, Constancy and Change Over Time (2.1 - 2.6)	**What is the molecular basis of heredity?** How does DNA affect organisms' morphology and physiology?	**Students will** **Life Sciences** • investigate DNA. • investigate encoding and replication. **Scientific Inquiry** **All scientific inquiry bullets are included in this guiding question.** **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • examine the interaction between science and technology. • explore the impact of science on personal and community health. • analyze how science and technology are necessary for solving issues. • analyze the role science plays in everyday life and compare different careers in science. • recognize that scientific knowledge is subject to change. • investigate advances that have effects on science and society. **Agri-biology Content Chart** • relate fundamentals of genetics to organisms' morphology, physiology, and inheritance patterns. • compare anatomy, breeding, and reproduction of animal species.

Sample Activities	Sample Extensions for Diverse Learners
Students will • examine structure of DNA. Extract DNA from onion cells to observe color, texture, and thread-like structure. Construct models of DNA molecules and show locations of genes. Display models in science labs. Write articles for school newspapers concerning future applications of information derived from the Human Genome Project (*WP - Transactive*). • research use of DNA fingerprinting in food and animal science. Run DNA fingerprinting through electrophoresis to show how DNA fragmentation analysis can be used for identification. Create multimedia presentations explaining how public health safety workers track spread of bacteria (e.g., Listeria) and other pathogens. Explain procedure and results in learning logs. • read Watson's account of his discovery of DNA structure. Summarize method used and evidence gathered. Investigate lives of other researchers who were involved in discovery (e.g., Francis Crick, Rosalind Franklin, Maurice Wilkins). Write resumes for each researcher. • examine replication. Use models of DNA molecules to show how one DNA molecule can form exact duplicate of itself. • investigate protein synthesis, including transcription and translation. Explore evolutionary significance of common genetic language. Create models to demonstrate process. • distinguish between simple Mendelian inheritance (e.g., coat color in rabbits), multiple allelic inheritance, and polygenic inheritance (e.g., cob length in corn). • create hypothetical corn plants, using different colored paper clips for traits (e.g., height, leaf color, seed color). Record phenotypes and genotypes in learning logs. Investigate traits controlled by extranuclear DNA (e.g., mitochondrial). Determine inheritance patterns in plants (e.g., variegated leaf trait of Brassica rapa). Write feature articles for agricultural journals explaining differences in inheritance patterns (*WP - Transactive*). • study family relationships of livestock, using phenotypic records extending over two or more generations. Choose traits (e.g., dwarfism in Hereford cattle) and gather information about traits ancestors exhibited to complete pedigrees. Use Punnett squares to determine apparent inheritance patterns for that trait.	Betty and Agnes already have an understanding of DNA as it applies to genetics. They will use the Internet and other sources to discover new or potential uses for DNA technologies. They will communicate with forensic medicine specialists about their findings and create presentations to share with their class (*Types of extensions: magnitude, motivation, resources and materials, complexity*). Bryan and Melissa are able to learn with their peers, but have difficulty following directions. They will pair with classmates to investigate phenotypic and genotypic inheritance patterns (*Types of extensions: complexity, resources and materials*).

Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale, and Models, Constancy and Change Over Time (2.1 - 2.6)	**What is the molecular basis of heredity?** How does DNA affect organisms' morphology and physiology?	**Students will** **Life Sciences** • investigate DNA. • investigate encoding and replication. **Scientific Inquiry** **All scientific inquiry bullets are included in this guiding question.** **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • examine the interaction between science and technology. • explore the impact of science on personal and community health. • analyze how science and technology are necessary for solving issues. • analyze the role science plays in everyday life and compare different careers in science. • recognize that scientific knowledge is subject to change. • investigate advances that have effects on science and society. **Agri-biology Content Chart** • relate fundamentals of genetics to organisms' morphology, physiology, and inheritance patterns. • compare anatomy, breeding, and reproduction of animal species.

Sample Activities	Sample Extensions for Diverse Learners
Students will • use sire summaries to distinguish between performance testing and progeny testing. Examine copies of pedigree papers of several animals of same breed. Compare animals based on pedigrees and performance records. Develop reports for agricultural advisory committees on beef breed improvement in their county. Investigate benefits of hybrid vigor. • research physical characteristics of economically important agricultural animals (e.g., sheep, cattle, swine). Determine whether traits are influenced more by genetics or environment. • obtain copies of dairy cattle sire catalogs and lineage classification data from dairy herds. Using data on females from herd records and data on sires from catalogs, choose most desirable sires for cows in that herd. Write introductions for catalogs describing how the information contained within can be used to improve herd quality *(WP - Transactive)*.	

Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale, and Models, Constancy and Change Over Time (2.1 - 2.6)	**How do behavioral patterns ensure reproductive success?** How do agriculturalists manipulate reproductive success?	**Students will** **Life Sciences** • investigate cell regulation, differentiation, and how the process of photosynthesis provides a vital connection between the Sun and energy needs of living systems. • investigate behavioral responses. • analyze patterns of behavior. **Scientific Inquiry** **All scientific inquiry bullets are included in this guiding question.** **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • examine the interaction between science and technology. • analyze how science and technology are necessary for solving issues. • recognize that scientific knowledge is subject to change. • investigate advances that have effects on science and society. **Agri-biology Content Chart** • compare anatomy, breeding, and reproduction of animal species. • identify functions of plant structures. • identify environmental factors that affect crop production.

Sample Activities	Sample Extensions for Diverse Learners
Students will • investigate life cycle of flowering plants. Create models, bulletin boards, or collages demonstrating cycles. Label all plant parts and describe function. Summarize in learning logs why knowledge of plant life cycles is important to agriculturalists. • investigate various forms of pollination (e.g., wind, water, insect). Create charts to compare forms of pollination in plant families. Investigate coevolution between plants and pollinators. Design and conduct investigations to determine effects of absence of pollinators on plant reproduction. Research use of bees as pollinators and diseases that have reduced bee populations. Write articles for agricultural journals explaining impact of reduced bee populations on crops *(WP - Transactive)*. • investigate reactants and products of photosynthetic chemical reaction. Use light screens on Geranium leaves. Conduct iodine tests after several days to determine effects of light and absence of light on production of carbohydrates in leaves. Place *Elodea* plants into carbonate solutions under bright light. Count oxygen bubbles as they emerge from cut ends of *Elodea* plants. Analyze activities and produce an empirical word equation for photosynthetic chemical reaction. Investigate ways to increase or decrease rate of oxygen production. Compare photosynthesis in plants adapted to life in arid conditions with plants growing in Kentucky. • investigate vegetative propagation (e.g., rhizomes, stolens, tubers, grafting). Compare advantages and disadvantages to plants and humans of vegetative propagation over sexual reproduction. Propagate different species of plants in class and compare results. Distribute plants at parents' night. • research behaviors (e.g., social, reproductive, feeding) of agricultural animals. Determine how livestock producers deal with animal behaviors (e.g., feeding schedules, facility designs). Observe flock or herd animals, listing observed behaviors and determine which behaviors are instinctive and which are learned. Shadow county extension agents or veterinarians to determine how agriculturalists deal with problems related to livestock behaviors.	

Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale, and Models, Constancy and Change Over Time (2.1 - 2.6)	**How do behavioral patterns ensure reproductive success?** How do agriculturalists manipulate reproductive success?	**Students will** **Life Sciences** • investigate behavioral responses. • analyze patterns of behaviors. **Scientific Inquiry** **All scientific inquiry bullets are included in this guiding question.** **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • examine the interaction between science and technology. • analyze how science and technology are necessary for solving issues. • recognize that scientific knowledge subject to change. • investigate advances that have effects on science and society. **Agri-biology Content Chart** • compare anatomy, breeding, and reproduction of animal species. • identify functions of plant structures. • identify environmental factors that affect crop production.

Sample Activities	Sample Extensions for Diverse Learners
Students will • compare size and shape of sperm and egg cells of animal species. Check semen samples under microscopes for motility. Determine if any sperm cells are abnormal. Observe color, mobility, progressiveness, and abnormalities (e.g., tailless, two tails, two heads, pear-shaped heads). Examine prepared slides of ovary. Sketch ovary, including mature follicles and eggs. Prepare lab reports comparing features of each reproductive cell and explaining how traits of each help them perform their functions. • investigate codominance in livestock (e.g., shorthorn cattle). Design experiments to determine probability of different phenotypic expressions (e.g., coat color) in first and second generation offspring. Write lab reports detailing procedures and results to share with peers. ***Technology suggestion:*** *Use integrated software package to create tables and charts for analysis.* • research use of different breeding procedures in agricultural animals (e.g., horses, turkeys) and crops (e.g., corn). Write to breed associations to request information on disqualification of animals or plants for different breeds. Compare information from various associations. Interview livestock producers to determine traits for which they selectively breed. Investigate preferred plant traits in economically important crops. Research impact of selective breeding on agricultural animals and crops. Debate ethical and environmental implications of selective breeding. • demonstrate insemination process using female reproductive tracts acquired from biological supply houses or local slaughter houses. Identify different parts of female reproductive tracts. Identify appropriate insemination tools needed. Use tools to demonstrate insemination process, by placing dye solution in reproductive tract. Follow accepted procedures to dissect tracts to locate point where dye was deposited. Sketch reproductive tracts, identify parts, and describe steps of insemination process in lab reports. • survey local livestock producers to determine artificial insemination and embryo transfer techniques used. Investigate reasons for employing these techniques. Compare costs of semen and embryos from different breeders and examine reasons for cost differences. Write feature articles for agricultural journals explaining advantages and disadvantages of techniques *(WP - Transactive).*	Justin and Juanita have difficulty following directions. They are given instructions one day prior to assignment. They will be paired with peers to complete insemination procedures *(Types of extensions: time, motivation, environment, participation, demonstration of knowledge).*

Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working Patterns, Systems, Scale, and Models, Constancy and Change Over Time (2.1 - 2.6)	**What are the processes of biological change?** How do agricultural crops and animals reflect diversity in nature?	**Students will** **Program of Studies** **Life Sciences** • examine how species change over time. • examine diversity and classification. **Scientific Inquiry** **All *Program of Studies* scientific inquiry bullets are included in this guiding question.** **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • examine the interaction between science and technology. • analyze how science and technology are necessary for solving issues. • recognize that scientific knowledge is subject to change. • investigate advances that have effects on science and society. **Agri-biology Content Chart** • identify functions of plant structures. • identify structural, physiological and behavioral characteristics of vertebrates and invertebrates. • relate fundamentals of genetics to organisms' morphology, physiology, and inheritance patterns.

Sample Activities	Sample Extensions for Diverse Learners
Students will • investigate history of domestication of economically important plants (e.g., wheat, corn, sugar cane). Create illustrated time lines to document milestones. ***Technology suggestion:*** *Use software to create time lines.* • create plant models, labeling, describing, and explaining each structure. Write children's books describing functions of plant parts *(WP - Transactive).* • examine plant cell structures with light microscopes. Create cell models, labeling basic cell structure (e.g., cell wall, cell membrane, nucleus, cytoplasm, chloroplast, vacuoles). Describe functions of cell structures on mechanical rather than biochemical level (e.g., nucleus and control of cell function, chloroplast and photosynthesis, mitochondria and respiration, cell membrane and transport). ***Technology suggestion:*** *Use light microscope or flex cams to examine cell structures.* • investigate plant defenses (e.g., poisons, thorns, hormones) and coevolution between plants and herbivores. Identify selective pressures acting on both herbivores and plants. Write news articles for agricultural journals explaining how plants reduce predation *(WP - Transactive).* • investigate irradiation on plant seeds to induce mutations and produce new varieties (e.g., peppers, soybeans, cotton, sugar cane, sunflowers, irises, roses, chrysanthemums, azaleas). Write articles about benefits and drawbacks of irradiation *(WP - Transactive).*	Willie and Ann understand cell structure and have participated in class discussions. They have difficulty manipulating objects and will work with small groups to produce models of cells *(Types of extensions: resources and materials, complexity, demonstration of knowledge).*

Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale, and Models, Constancy and Change Over Time (2.1 - 2.6)	**What are the processes of biological change?** How do agricultural crops and animals reflect diversity in nature?	**Students will** **Life Sciences** • examine how species change over time. • examine diversity and classification. **Scientific Inquiry** **All *Program of Studies* scientific inquiry bullets are included in this guiding question.** **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • examine the interaction between science and technology. • analyze how science and technology are necessary for solving issues. • recognize that scientific knowledge is subject to change. • investigate advances that have effects on science and society. **Agri-biology Content Chart** • identify functions of plant structures. • identify structural, physiological and behavioral characteristics of vertebrates and invertebrates. • relate fundamentals of genetics to organisms' morphology, physiology, and inheritance patterns.

Sample Activities	Sample Extensions for Diverse Learners
Students will • explore diversity among plants. Identify major highlights of plant evolution (e.g., vascular tissue) and impact on plant diversification. Identify divisions within plant kingdom and describe their characteristics and significant adaptations. Use graphic organizers to compare characteristics. Create bulletin boards, collages, or multimedia presentations on economic or medical importance of plants from each division, including local agricultural products. • compare monocot and dicot seeds. Place corn and bean seeds between wet blotters or paper towels and keep moist. Bisect and compare seeds after one day and after five days. Sketch, identify and label structures, and describe function of seed structures. • investigate evolution of various species (e.g., horses). Create murals depicting phylogenetic trees. Discuss how adaptations are advantageous to increased survival. • investigate early systems of classification (e.g., Aristotle). Compare Aristotle's system to that of Linnaeus. Create dichotomous keys for domestic plants and animals. Display in science lab. • examine differences between tamed and domesticated animals. Create collages, bulletin boards, or multimedia presentations for class members, explaining differences. Compare traits of wild and domesticated pigs. Identify traits that resulted from natural selection or selective breeding. Explain how wild pigs are adapted to their environment. Research history of breeds of livestock, including origin of animals, traits that were selected for through natural selection, traits that were selected for through selective breeding, and changes of breeds over time. Create illustrated histories of breeds to display at county fairs. ***Technology suggestion:*** *Use CD-ROMs, digital cameras, computers, video, and audio to create multimedia presentations.*	Bambi and Renee are interested in the domestication of certain animals. They finish their class assignment ahead of other students and develop short skits to share with the class on the domestication of cats and dogs *(Types of extensions: motivation, complexity, demonstration of learning).*

Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working Patterns, Systems, Scale, and Models, Constancy and Change Over Time (2.1 - 2.6)	**How are organisms within ecosystems interdependent?** How do agricultural processes alter ecosystems? How are croplands different from natural ecosystems?	**Students will** **Life Sciences** • investigate cell regulation, differentiation, and how the process of photosynthesis provides a vital connection between the Sun and energy needs of living systems. • investigate the cycle of atoms and molecules within the biosphere. • analyze energy flow through ecosystems. • examine the factors that influence the interactions between organisms. • explore how human activities alter ecosystems. • recognize that living systems require energy. • analyze the flow of matter and energy. **Scientific Inquiry** **All *Program of Studies* scientific inquiry bullets are included in this guiding question.** **Applications/Connections** • explore the impact of science on personal and community health. • recognize how science influences human population growth. • use science to analyze the use of natural resources. • investigate how science can be used to solve environmental quality problems. • use science to investigate hazards. • analyze how science and technology are necessary for solving issues. **Agri-biology Content Chart** • identify environmental factors that affect crop production. • identify physical properties and biological components of soils.

Sample Activities	Sample Extensions for Diverse Learners
Students will • investigate nitrogen cycle within biosphere. Examine nodules from roots of legumes (e.g., clover, alfalfa) under microscopes after staining with methylene blue. Sketch nitrogen-fixing bacteria. Write summaries in learning logs about importance of bacteria to nitrogen cycle. • investigate ways to change pH of soils. Interview agricultural extension agents to determine methods of changing pH. Analyze cost and efficacy of each method. Create how-to articles for agricultural publications *(WP - Transactive).* • design experiments to model processes that led to Dust Bowl of 1930s. Research soil conservation practices and techniques to prevent another Dust Bowl. Compare conservation practices and techniques of past with those of present in multimedia presentations. • investigate physical and chemical characteristics of ponds, springs, and rivers near agricultural cropland. Examine dissolved oxygen levels, turbidity, and bacterial growth. Compare data with students in other regions of Kentucky via Kentucky Water Watch Program. • investigate effects of pollutants (e.g., acid rain) on agricultural crops. Design and conduct investigations to measure acidity of rain water. Map Kentucky rain water acidity levels and compare crop loss due to pollutants with other Kentucky students. • investigate early and modern pesticides, comparing benefits of each. Debate effects of pesticides on beneficial organisms (e.g., soil invertebrates, insects, birds, mammals). Research pests (e.g., fungi, grasshoppers, corn borers) that damage major world crops. Research use of biological control of insects (e.g., ladybugs to control aphids). Produce articles for agriculturalists advocating biological control of pests (*WP - Transactive).* • investigate benefits and losses to crops due to recent weather patterns (e.g., floods, drought, wind, hail). Create collages of current news articles on agricultural impact by environmental forces. Research weather prediction techniques. Research current studies on causes of weather patterns (e.g., Arizona, 1998) and discuss validity of studies. Interview local agriculturalists to determine impact of economic losses due to weather. Write articles on impact weather has on agricultural crops and animals *(WP - Transactive).*	

Academic Expectations	Guiding Questions	Correlations to the Program Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale, and Models, Constancy and Change Over Time (2.1 - 2.6)	**How do organ systems work together to keep animals healthy?**	**Students will** **Life Science** • investigate cell structures and their functions. **Scientific Inquiry** **All scientific inquiry bullets are included in this guiding question.** **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • examine the interaction between science and technology. • explore the impact of science on personal and community health. • use science to investigate hazards. • analyze how science and technology are necessary for solving issues. • recognize that scientific knowledge is subject to change. • investigate advances that have effects on science and society. **Agri-biology Content Chart** • identify structural, physiological, and behavioral characteristics of vertebrates and invertebrates.

Sample Activities	Sample Extensions for Diverse Learners
Students will • identify and describe organs and organ systems and anatomical structures of important agricultural animals. List organs common to all and those that differ. Explain physiological functions of each structure. Research common diseases that affect each system and methods used to diagnose and treat diseases. Create brochures to be distributed at county extension offices that describe diseases and treatments (*WP - Transactive).*	

Academic Expectations	Guiding Questions	Correlations to the Program of Studies
Scientific Ways of Thinking and Working, Patterns, Systems, Scale, and Models, Constancy and Change Over Time (2.1 - 2.6)	**What skills and knowledge must I have to be successful in an agricultural career in Kentucky?**	**Students will** **Life Sciences** • examine the factors that influence the interactions between organisms. **Scientific Inquiry** **All scientific inquiry bullets are included in this guiding question.** **Applications/Connections** • apply scientific inquiry and conceptual understandings to solving problems of technological design. • examine the interaction between science and technology. • explore the impact of science on personal and community health. • analyze how science and technology are necessary for solving issues. • analyze the role science plays in everyday life and compare different careers in science. • recognize that scientific knowledge is subject to change. • investigate advances that have effects on science and society. **Agri-biology Content Chart** • compare appropriate health programs for animal species. • identify major farm animal species, appropriate livestock enterprises, and their influence on world agriculture trends. • explore career opportunities and job qualifications in agri-biology. • integrate FFA Leadership activities.

Sample Activities	Sample Extensions for Diverse Learners
Students will • examine contributions of livestock industry to society. Investigate use of animals and animal by-products in medical research and development of food products. Prepare multimedia presentations showing uses of animals and animal by-products. ***Technology suggestion:*** *Use CD-ROMs, digital cameras, computers, video, and audio to create multimedia presentations.* • investigate other issues of animal welfare (e.g., raising animals in confinement, animal health, management practices, continuous ingestion of antibiotics). Investigate role of food pyramid in determining proper diet selections for animals. Examine laws governing use of agricultural animals. Role-play public hearing between National Cattlemen's Association, United States Department of Agriculture official, People for the Ethical Treatment of Animals, and different types of vegetarians. Debate animal welfare issues. • search Internet for alternatives to Kentucky's tobacco crop. Investigate new and non-traditional crops as possible solutions. Research economic and social implications. Write letters to congressmen explaining results of research and recommendations for alternative crops *(WP - Transactive).* ***Technology suggestions:*** *Use Internet to conduct research. Use e-mail to communicate with congressmen.* • research scientific technologies (e.g., hydroponics, tissue culturing) that enhance agricultural endeavors. Create models of food supply systems using hydroponics and tissue culturing technology. Compare hydroponics method of growing crops to traditional methods. Debate advantages (e.g., reduction of labor costs) and disadvantages (e.g., disease introduction).	Teresa and Larry will create brochures to promote the introduction of new economic and agricultural crops for Kentucky. They will collaborate with agriculturalists (e.g., universities, colleges, county extension offices) to discover feasibiliy of their suggestions *(Types of extensions: motivation, complexity, demonstration of learning, resources and materials*).

Agiscience Exploration

Course Description: The course content focuses on exploring current and future agricultural careers as well as the historical events that molded the industry. The local agricultural industry is emphasized, and the local high school program and FFA activities are featured. Leadership development will be provided through FFA. Classroom, laboratory and field trip experiences should be provided.

Academic Expectations	Content/Process
	Students will
1.1, 2.36, 2.38	• summarize careers in agriculture and list verifiers of workplace readiness.
1.1, 2.3, 2.20	• review the historical importance of the agricultural industry and how agriculture shaped world history.
2.36, 3.4	• identify and research careers in agriculture.
3.7, 5.1	• conduct a career self-analysis.
5.4	• visit the agricultural department at the high school and become acquainted with the curricula.
3.1	• recognize the opportunities for leadership development provided by the FFA organization.
2.7	• relate the importance of agriculture in the local, state, national, and global economies.
1.3	• identify tools, equipment and materials common in agriculture.
2.1,2.2,2.16	• identify current, major contemporary issues in agriculture.
1.16	• give examples of the new technological developments in agriculture.
2.29	• examine basic home and farm safety.

Connections

- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)

Principles of Agricultural Science and Technology

Course Description: This course provides instruction in the foundations of the various segments of the agricultural industry. Agricultural career opportunities will be emphasized. Animal science, plant and land science, and agricultural mechanics skills will be the focus of the curriculum. The selection and planning of a supervised agricultural experience program and related record keeping will be presented. Leadership development will be provided through FFA. Students will receive personal guidance and counseling with preparatory instructional program selection.

Academic Expectations	Content/Process
	Students will
1.1, 2.36, 2.38	• demonstrate employability and social skills relative to the career cluster.
2.13,2.18, 3.0	• develop a supervised agricultural experience programs including use of record keeping.
1.12,1.9,2.38	• explore basic agricultural skills needed including: math, communication, and employability skills.
2.1, 2.3, 2.6	• identify and examine general soil and plant sciences.
2.1, 2.3, 2.6	• identify and examine general animal sciences.
2.37,2.4,2.7	• demonstrate basic agricultural mechanics and construction skills.
2.6, 2.19, 2.20	• investigate basic environmental, food and fiber interrelationships.
1.11,2.13,2.18	• maintain records on supervised agricultural experience program and be able to summarize and analyze results in making financial decisions.
1.12,2.16,2.37	• participate in FFA leadership activities which are integrated into the course.

Connections

- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)

Agriscience

Course Description: Agriscience introduces the scientific agricultural approach to animal science and selection, plant and land science, and agricultural mechanics. Agricultural career opportunities will be emphasized in each class. Laboratory experiences relating to basic and current technology will be part of the program. Content may be enhanced by utilizing appropriate computer applications. Leadership development will be provided through FFA. Each student will be expected to have a supervised agricultural experience program and keep appropriate records.

Academic Expectations	Content/Process
	Students will
1.1, 2.36, 2.38	• demonstrate employability and social skills relative to the career cluster.
2.10,2.37,2.4	• demonstrate basic agriculture mechanics and agricultural construction skills.
2.1, 2.3, 2.6	• assess soil and plant science interrelationships.
2.1, 2.3, 2.6	• determine principles of animal production.
2.20, 2.6, 2.19	• investigate the impact of human activities on the environment and resource conservation and stewardship.
1.16, 2.3	• examine the electronic and bio-technical advancements in agriculture.
2.19	• interpret the impact of globalization on agriculture.
1.11,2.13,2.18	• maintain records on supervised agricultural experience program and be able to summarize and analyze results in making financial decisions.
1.12,2.16,2.37	• utilize activities of FFA as an integral component of course content and leadership development.
1.9, 1.10, 1.12	• apply science, math and communication skills within the technical content.

Connections

- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)

Animal Science

Course Description: Animal Science develops basic knowledge and skills pertaining to livestock identification, selection, nutrition, reproduction and genetics, health management, and marketing of one or more species of farm animals. The latest biotechnological applications will be included. The content may be enhanced with appropriate computer applications. Leadership development will be provided through FFA. Each student will be expected to have a supervised agricultural experience program.

Academic Expectations	Content/Process
	Students will
1.1, 2.36, 2.38	• demonstrate employability and social skills relative to the career cluster.
2.20,2.36,4.5	• relate the benefits of animals to human kind in local, national and world agriculture.
2.3, 5.3	• utilize proper animal science terminology.
2.3, 2.6, 2.20	• distinguish various breeds of livestock.
1.11,2.3,4.2,4.6	• select and evaluate livestock.
2.1,2.2,2.3,5.4	• apply reproductive principles to breeding practices of livestock.
2.1,2.2,2.3,5.3	• summarize digestive principles to livestock nutrition practices.
2.1,2.2,2.6, 5.1	• evaluate proper animal health techniques in the livestock industry.
2.1,2.2,2.3,2.4	• apply biotechnological principles to the livestock industry.
2.2, 2.16, 2.29	• relate animal agriculture to the environment.
2.13, 2.18	• evaluate animal products and by-products of the livestock industry.
1.11, 2.13,2.18	• maintain records on supervised agricultural experience program and be able to summarize and analyze results in making financial decisions.
1.12,2.16,2.37	• utilize activities of FFA as an integral component of course content and leadership development.
1.9, 1.10, 1.12	• apply science, math and communication skills within the technical content.

Connections

- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- National Council for Agriculture Education Skill Standards in Bio-Technology

Equine Science

Course Description: Equine science develops knowledge and skill pertaining to breed identification and selection, anatomy, physiology, nutrition, genetics and reproductive management, training principles, grooming, health disease, parasite control and sanitation practices. Content may be enhanced with appropriate computer applications. Leadership development will be provided through FFA. Each student will be expected to have an agricultural experience program.

Academic Expectations	Content/Process
	Students will
1.1,2.36,2.38	• demonstrate employability and social skills relative to the career cluster.
2.36, 4.5, 6.3	• relate the benefits of the equine industry to humankind in local, national, and world agriculture.
1.10,2.6,4.3	• contrast equine anatomy, physiology and soundness of different breeds.
2.1,2.2,2.3	• relate the anatomy and physiology of the equine digestive system to proper nutritional practices.
2.1,2.2,2.6	• utilize health and sanitation practices in the equine industry.
1.15,2.3,2.37	• demonstrate proper grooming and handling techniques in the equine industry.
2.19,2.20,2.3	• evaluate the role of equine domestication and the various types of equine in the world today.
2.1, 2.2, 2.3	• identify the anatomy and physiology of the equine reproductive system and utilize proper breeding techniques.
1.15,2.3,2.37	• utilize proper horsemanship and showmanship practices in the equine industry.
1.15,2.2,2.4	• determine the various training principles in the equine industry.
1.11,2.13,2.18	• maintain records on supervised agricultural experience program and be able to summarize and analyze results in making financial decisions.
1.12,2.16,4.0	• utilize activities of FFA as an integral component of course content and leadership development.
1.9, 1.10, 1.12	• apply science, math and communication skills within the technical content.

Connections

- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- National Council for Agriculture Education Skill Standards in Bio-Technology

Animal Technology

Course Description: Animal Technology instruction concentrates on the advanced production practices and current biotechnological applications of one or more species of farm animals, based on the local community needs. Hands-on experiences will be emphasized. Content may be enhanced by utilizing appropriate computer applications. Leadership development will be provided through FFA. Each student will be expected to have a supervised agricultural experience program.

Academic Expectations	Content/Process
	Students will
1.1, 2.36, 2.38	• demonstrate employability and social skills relative to the career cluster.
2.1,2.2,2.3,5.4	• utilize proper breeding management principles and techniques in the livestock industry.
2.2, 2.9, 1.1	• utilize proper housing/handling principles and techniques in the livestock industry.
2.1,2.2,2.3,5.3	• utilize proper feeds/feeding principles and techniques in the livestock industry.
2.7, 2.13, 2.30	• demonstrate proper sanitation/health management principles and techniques in the livestock industry.
2.7, 2.13, 2.30	• utilize proper marketing principles and techniques used in the livestock industry.
2.1,2.2,2.3,2.4	• apply biotechnology to the livestock industry and relate impact of animal agriculture to the environment.
2.1,2.2,2.3,5.4	• utilize various animal husbandry practices in the livestock industry.
2.1,2.2,4.3,5.4	• utilize advanced principles and techniques of beef cattle, dairy cattle, swine, sheep, poultry, and specialty animal management.
1.11,2.13,2.18	• maintain records on supervised agricultural experience program and be able to summarize and analyze results in making financial decisions.
1.12,2.16,2.37	• utilize activities of FFA as an integral component of course content and leadership development.
1.9, 1.10, 1.12	• apply science, math and communication skills within the technical content.

Connections

- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- National Council for Agriculture Education Skill Standards in Bio-Technology

Advanced Animal Science

Course Description: A freshman-level college course which introduces students to a survey of genetics, reproductive physiology, growth and development, nutrition and digestive physiology, anatomy, meat science and overviews of the dairy, poultry, equine, beef, sheep, swine, and aquaculture industries. Opportunity is provided for students to earn three (3) hours of introductory college credit. Content may be enhanced by utilizing appropriate computer applications. Leadership development will be provided through FFA. Each student will be expected to have an agricultural experience program.

Academic Expectations	Content/Process
	Students will
1.11,2.36,2.38	• demonstrate employability and social skills relative to the career cluster.
1.1, 2.20, 4.5	• describe the importance of animal agriculture to human needs from a nutritional and global perspective.
1.10, 5.1	• differentiate between the different classifications of livestock species.
2.2	• explain the principles of breeding and genetics of livestock species.
1.1	• discuss the principles of reproduction in species of livestock.
1.1	• determine the nutritional requirements for livestock species.
2.1	• assess the principles of health management for livestock.
2.1	• compare the anatomy, growth, and development of livestock species.
2.7	• relate products and by-products to livestock production.
2.13	• analyze segments of the livestock industry.
1.11,2.13,2.18	• maintain records on supervised agricultural experience program and be able to summarize and analyze results in making financial decisions.
1.12,2.16,2.37	• utilize activities of FFA as an integral component of course content and leadership development.
1.9, 1.10, 1.12	• apply science, math and communication skills within the technical content.

Connections

- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- National Council for Agriculture Education Skill Standards in Bio-Technology

Plant and Land Science

Course Description: Plant and Land Science develops basic scientific knowledge and skills pertaining to management of the land and its effects on food and fiber production, the environment, and the quality of life. The relationship of land to plant growth will be emphasized. Plant composition, reproduction, growth, and current biotechnological advances will be included. Content may be enhanced with appropriate computer applications. Leadership development will be provided through FFA. Each student will be expected to have a supervised agricultural experience program.

Academic Expectations	Content/Process
	Students will
1.1, 2.36, 2.38	• demonstrate employability and social skills relative to the career cluster.
2.19,2.20,2.36	• assess the benefit of plants and land to human kind in local, national, and world agriculture.
2.2, 2.4, 2.6	• relate the physical properties of soil to plant and land use.
2.2, 2.4, 2.6	• relate the chemical properties of soil to plant and land use.
2.2, 2.4, 2.6	• relate the biological properties of soil to plant and land use.
2.2,2.15,2.20	• critique the principles of good land use.
4.1,2.2,2.4	• select appropriate plant nutrition practices and management.
2.1,2.2,2.4,2.6	• examine the processes for plant development, growth, and reproduction.
2.1,2.2,2.4,2.3	• relate biotechnology to plant production.
1.11,2.13,2.18	• maintain records on supervised agricultural experience program and be able to summarize and analyze results in making financial decisions.
1.12,2.16,2.37	• utilize activities of FFA as an integral component of course content and leadership development.
1.9, 1.10, 1.12	• apply science, math and communication skills within the technical content.

Connections

- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- National Council for Agriculture Education Skill Standards in Bio-Technology

Crop Technology

Course Description: Crop Technology instruction concentrates on the production practices and current biotechnological applications of or more agriculture crops. Hands-on experiences will be emphasized. Instruction will include variety selection, seed bed preparation, fertilization, pest, weed and disease control, harvesting, and marketing crops. Current biotechnological applications may be included. Content may be enhanced with appropriate computer applications. Leadership development will be provided through FFA. Each student will be expected to have an agricultural experience program.

Academic Expectations	Content/Process
	Students will
1.1, 2.36, 2.38	• demonstrate employability and social skills relative to the career cluster.
2.19,2.20,2.36	• specify the benefit of crop production in local, national, and world agriculture.
2.2,2.10,2.19	• relate the economic factors of crop production in local, national, and world agriculture.
2.2,2.6,2.19	• evaluate environmental factors of crop production in local, national, and world agriculture.
2.2,2.4,2.3,2.6	• determine the impact of soil and water resources on crop production.
2.2,2.6,2.9,5.1	• utilize management practices in row crops.
2.2,2.6,2.9,6.3	• utilize management practices in small grains.
2.2,2.6,2.9,5.1	• utilize management practices in forages/pastures.
2.1,2.2,2.3,2.4	• relate biotechnology to plant production.
1.11,2.13,2.18	• maintain records on a supervised agricultural experience program and be able to summarize and analyze results in making financial decisions.
1.12,2.16,2.37	• utilize activities of FFA as an integral component of course content and leadership development.
1.9, 1.10, 1.12	• apply science, math and communication skills within the technical content.

Connections

- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- National Council for Agriculture Education Skill Standards in Bio-Technology

Advanced Plant Science

Course Description: A freshman-level course which introduces students to the world of plants. The course is a survey of botany, agronomy, horticulture, soils, forestry, and other areas of plant science. Opportunity is provided for students to earn three (3) hours of introductory college credit.
Content may be enhanced by utilizing appropriate computer applications. Leadership development will be provided through FFA. Each student will be expected to have a supervised agricultural experience program.

Academic Expectations	Content/Process
	Students will
1.1, 2.36, 2.38	• demonstrate employability and social skills relative to the career cluster.
2.19,2.20,2.36	• explain the significance of plant science to fulfill basic human needs.
2.2,2.3,2.4,2.6	• differentiate between sexual and asexual plant propagation and reproduction.
2.1,2.2,2.3,2.5	• assess the environmental factors affecting plant growth and development.
2.1,2.2,2.3,2.4	• determine plant processes such as photosynthesis, respiration, and other processes.
2.2,2.3,2.4,2.5	• relate genetic processes to plant breeding and crop production.
2.2,2.3,2.4,2.5	• examine the plant cell and its related structures.
2.2,2.3,2.4,2.5	• explain seed germination and life cycles.
2.2,2.4,2.6	• summarize the physical and chemical properties of soil and other plant growing media.
2.2,2.3,2.4,2.5	• relate harvest and post harvest processes to various plants.
2.2,2.3,2.4,2.5	• appraise plant pest control and management.
2.2,2.3,2.4,2.5	• review plant ecosystems and sustainability
1.11,2.13,2.18	• maintain records on a supervised agricultural experience program and be able to summarize and analyze results in making financial decisions.
1.12,2.16,2.37	• utilize activities of FFA as an integral component of course content and leadership development.
1.9, 1.10, 1.12	• apply science, math and communication skills within the technical content.

Connections

- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- National Council for Agriculture Education Skill Standards in Bio-Technology

Small Power Equipment

Course Description: This course is designed to develop skills in maintenance, repair, and operation of equipment, small combustion-type engine and electric motors. Content may be enhanced with appropriate computer applications. Leadership development will be provided through FFA. Each student will be expected to have a supervised agricultural experience program.

Academic Expectations	Content/Process
	Students will
1.1, 2.36, 2.38	• demonstrate employability and social skills relative to the career cluster.
2.2, 2.7, 2.3,	• identify basic small engine parts and principles of operations and their applications in agriculture
2.37, 2.7, 1.1	• identify small engine systems: fuel/air, cooling, compression, ignition, lubrication.
1.1, 2.37	• perform maintenance schedules and procedures for agricultural small engines.
1.1,1.2,1.3, 2.1, 1.1	• practice safe operation procedures and techniques when repairing or operating small engines.
2.10, 2.7	• perform small engine trouble shooting skills.
2.7, 2.9, 2.10	• determine small engine specifications using precision measuring equipment.
2.9, 2.3, 2.37	• calculate piston displacement and compression ratio of a small engine.
1.3,1.1,2.1,2.3	• identify electric motor parts, principles of operations, and application in agriculture.
2.37	• service power transmissions.
1.11,2.13,2.18	• maintain, adjust and service small power machines utilized in agriculture.
1.12,2.16,2.37	• maintain records on supervised agricultural experience program and be able to summarize and analyze results in making financial decisions.
1.9, 1.10, 1.12	• utilize activities of FFA as an integral component of course content and leadership development.
	• apply science, math and communication skills within the technical content.

Connections

- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)

Agricultural Construction Skills

Course Description: Prepares students to construct and maintain agricultural structures and equipment. Develops basic skills such as: tool identification, interpreting plans, calculating a bill of materials, electrification, carpentry, welding, metal fabrication, plumbing, and masonry. Content may be enhanced with appropriate computer applications. Leadership development will be provided through FFA. Each student will be expected to have a supervised agricultural experience program. This course may be extended to two credits offered on a two-hour basis provided that instruction is enhanced with laboratory experience, project construction, and in-depth skill development.

Academic Expectations	Content/Process
	Students will
1.1, 2.36, 2.38	• demonstrate employability and social skills relative to the career cluster.
2.3, 2.30, 2.37	• demonstrate safe usage of hand woodworking and metal working tools.
2.3, 2.30, 2.37	• demonstrate safe usage of portable and stationary power machines.
2.5,2.1,2.37,2.2	• employ safe usage of electric arc welding techniques and machines.
2.5,2.1,2.37,2.2	• employ safe usage of gas heating, cutting, welding, and brazing techniques and equipment.
2.1, 2.2, 2.37	• use plumbing tools and fixtures.
2.3,2.8,2.9,2.10	• utilize tools, techniques, and formulas for concrete construction.
2.1,2.2,2.3, 2.5	• demonstrate the basic principles of electricity.
2.1,2.3,2.8,2.9	• select proper painting materials and tools.
2.1,2.3,2.8,2.9	• develop project plans including plans and bill of materials for agricultural project construction.
2.19, 2.20	• relate the influence of agricultural mechanics industry on globalized production.
1.11, 2.13, 2.18	• maintain records on supervised agricultural experience program and be able to summarize and analyze results in making financial decisions.
1.12,2.16,2.37	• utilize activities of FFA as an integral component of course content and leadership development.

Connections

- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)

Agricultural Structures and Designs

Course Description: This course prepares students to evaluate, design and construct agricultural structures. Students learn to design, evaluate and interpret construction plans and calculate a bill of materials. The skills learned in the Agricultural Construction Skills course may be incorporated to construct an agricultural structure. Content may be enhanced with appropriate computer applications. Leadership development will be provided through FFA. Each student will be expected to have an agricultural experience program. It is recommended that students complete the Agricultural Construction Skills course prior to enrolling.

Academic Expectations	Content/Process
	Students will
1.1, 2.36, 2.38	• demonstrate employability and social skills relative to the career cluster.
2.1, 1.1, 5.1	• investigate location and arrangement of agricultural structures and enclosures.
2.7, 2.9, 2.3	
1.1, 2.12	• identify tools, techniques, and formulas for concrete and masonry construction.
2.10, 2.7, 2.3	• relate electrical installations to the *National Electric Code* and local codes.
2.8, 1.1	• layout and level sites using surveying equipment.
2.10, 2.3	• develop agricultural water and waste systems plans.
2.19, 2.3	• construct agricultural structures to conserve soil and water resources.
1.11,2.13,2.18	• relate the influence of agricultural mechanics industry to globalized production.
1.12,2.16,2.37	• maintain records on supervised agricultural experience program and be able to summarize and analyze results in making financial decisions.
	• utilize activities of FFA as an integral component of course content and leadership development.

Connections

- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)

Agricultural Power and Machinery Operation

Course Description: This course provides instruction and hands-on experience in basic principles of agricultural machinery assembly, operation, maintenance, service, repair and safety. Content may be enhanced with appropriate computer applications. Leadership development will be provided through FFA. Each student will be expected to have a supervised agricultural experience program. This course may be extended to two credits and offered on a two-hour basis providing the instruction is enhanced with laboratory experience and in-depth skill development.

Academic Expectations	Content/Process
	Students will
1.1, 2.36, 2.38	• demonstrate employability and social skills relative to the career cluster.
2.20, 2.19	• identify the influence of agricultural mechanics industry on globalized production.
2.3, 2.37, 2.9	• relate basic engine parts to principles of operations.
2.3, 2.37, 2.2	• relate engine systems (carburation, compression, and ignition) to operation.
2.3, 2.37, 2.10	• identify and maintain transmissions and clutches.
2.3, 2.37, 2.10	• identify bearings types and seals.
2.3, 2.37, 2.9	• identify and maintain hydraulic systems.
1.1, 1.2, 5.5	• relate owner's manual and technical journals to specific equipment.
1.1, 1.2, 1.3	• follow maintenance schedules and procedures.
2.1,5.1,5.4,5.5	• develop troubleshooting skills.
5.1, 5.4, 6.2,	• demonstrate safe operation procedures and techniques.
2.8, 2.10, 5.5	• determine power requirements for optimum performance.
1.1, 2.6, 2.9	• develop a plan for preparing equipment for storage.
1.11,2.13,2.18	• maintain records on supervised agricultural experience program and be able to summarize and analyze results in making financial decisions.
1.12,2.16,2.37	• utilize activities of FFA as an integral component of course content and leadership development.

Connections

- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)

Floriculture / Floral Design

Course Description: Floriculture and floral design provides instruction to develop floral design techniques using silk, dried, and fresh flowers. Students will learn operation and management technics of a florist business as well as identification, production and cultural maintenance practices of plants used in floral design and interior landscaping. Content may be enhanced by utilizing appropriate technology. Leadership development will be provided through FFA. Each student will be expected to have a supervised agricultural experience program.

Academic Expectations	Content/Process
	Students will
1.1, 2.36, 2.38	• demonstrate employability and social skills relative to the career cluster.
2.3, 2.6,2.8,2.13	• relate floriculture/floral design practices to environmental impact.
2.22,2.23,2.9,5.2	• determine principles of design and elements of art in flower arranging.
2.5,6.1,2.9,2.22	• implement design skills in "real-world" connections.
2.22,2.23,6.1	• incorporate special techniques (bows, cards, wiring, tinting, etc.) into floral design.
2.3, 2.6, 5.1	• demonstrate techniques in conditioning and maintaining flowers and floral design materials.
1.1,2.3,2.10,5.1	• maintain industry-related equipment and materials.
1.1, 2.3, 5.4, 5.5	• apply safety regulations and practices.
2.33, 2.30,2.2	• formulate marketing plan.
2.3, 2.5,2.6,2.9	• apply principles of interior landscaping.
1.11, 2.13,2.18	• maintain records on a supervised agricultural experience program and be able to summarize and analyze results in making financial decisions.
1.12,2.16,2.37	• utilize activities of FFA as an integral component of course content and leadership development.
1.9, 1.0, 1.12	• apply science, math and communication skills within the technical content.

Connections

- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- National Council for Agriculture Education Skill Standards in Bio-Technology

Greenhouse Technology

Course Description: Greenhouse Technology provides instruction in greenhouse structures and greenhouse environment regulations. Plant growth and development and propagation are included as well as production and maintenance of bedding and container produced plants. Fundamental principles of vegetable production and commercial production of vegetable crops may be included. Content may be enhanced with appropriate technology. Leadership development will be provided through FFA. Each student will be expected to have a supervised agricultural experience program.

Academic Expectations	Content/Process
	Students will
1.1, 2.36, 2.38	• demonstrate employability and social skills relative to the career cluster.
1.1, 1.16, 2.10	• propose greenhouse structural designs and equipment.
2.3,2.6,2.8,5.5	• manipulate greenhouse environmental conditions.
2.2,2.3,2.4, 2.10	• prepare soils and planting media.
2.3, 2.2, 2.4, 2.6	• investigate plant processes and development.
2.3, 2.2, 2.4, 2.6	• select plant propagation methods.
2.1, 2.3,2.7,2.8	• implement bedding and vegetable crop production and management strategies.
2.33, 2.30, 2.2	• formulate marketing plan for greenhouse plants and/or vegetable crops.
2.30, 2.16, 2.37	• demonstrate business and marketing procedures.
1.1, 2.10, 2.3	• maintain, operate and repair facilities and equipment.
1.1, 2.3, 5.4, 5.5	• apply safety regulations and practices.
1.11, 2.13, 2.18	• maintain records on a supervised agricultural experience program and be able to summarize and analyze results in making financial decisions.
1.12, 2.16, 2.37	• utilize activities of FFA as an integral component of course content and leadership development.
1.9, 1.10, 1.12	• apply science, math and communication skills within the technical content.

Connections

- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- National Council for Agriculture Education Skill Standards in Bio-Technology

Landscaping and Turf Management

Course Description: This course combines landscaping and turf management curriculum. The material includes identification of landscape plants and their characteristics, site evaluation, site design, calculation of materials needed, costs for bidding, and installing landscape plans. Landscape plant maintenance will also be presented. Selection, culture and management of turf species used for lawns, golf courses, athletic fields and erosion control may also be included. Content may be enhanced by utilizing appropriate technology. Leadership development will be provided through FFA. Each student will be expected to have a supervised agricultural experience program.

Academic Expectations	Content/Process
	Students will
1.1, 2.26, 2.38	• demonstrate employability and social skills relative to the career cluster.
2.22,2.23, 2.10	• determine principles of design and elements of art in landscape design.
2.3, 2.6, 5.1, 5.4	• select appropriate plants for design.
2.7,2.8,2.9,2.10	• calculate costs of landscape plans for installation.
1.16,2.4,2.6,2.9	• recommend site preparation and landscape plan installation.
2.7,2.8,2.9, 2.10	• establish and maintain residential and commercial turf grass areas.
2.6,2.5,5.1,5.5	• formulate landscape and turf grass maintenance schedule.
2.7, 2.8,2.9,2.10	• calculate landscape maintenance costs
5.4,2.1	• maintain golf courses.
5.1,2.10,1.1,5.4	• maintain, operate and repair facilities and equipment.
2.10,1.1,5.1,5.4	• apply safety practices and regulations.
1.11,2.13,2.18	• maintain records on a supervised agricultural experience program and be able to summarize and analyze results in making financial decisions.
1.12,2.16,2.37	• utilize activities of FFA as an integral component of course content and leadership development.
1.9, 1.10, 1.12	• apply science, math and communication skills within the technical content.

Connections

- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- National Council for Agriculture Education Skill Standards in Bio-Technology

Nursery and Orchard Technology

Course Description: Nursery and orchard technology will provide instruction in production practices for container and field-grown nursery stock; identification, function, growing requirements, hardiness, problems and methods of different landscape plant materials; propagating and growing evergreens/deciduous plants; and the operation of garden centers and nurseries. Principles of home and commercial fruit production may also be included. Content may be enhanced by utilizing appropriate computer applications. Leadership development will be provided through FFA. Each student will be expected to have a supervised agricultural experience program.

Academic Expectations	Content/Process
	Students will
1.1, 2.36, 2.38	• demonstrate employability and social skills relative to the career cluster.
2.3,2.2,2.4,2.6	• investigate plant processes and plant development.
2.1,2.2,2.4,2.6	• demonstrate methods of plant propagation.
2.2,2.3,2.4,2.10	• prepare soils and planting media for nursery and/or orchard crops.
2.1,2.3,2.6,2.7 2.3,2.6,2.8,2.13	• implement production management strategies for nursery and/or orchard crops.
2.2,2.3,2.4,2.37	• relate nursery technology practices to environmental impact.
	• demonstrate harvesting and merchandising of nursery crops and/or orchard crops.
2.16, 2.30, 2.33	• formulate marketing plan for nursery and/or orchard crops..
2.8,2.10,5.1,5.5	• design and construct growing structures.
1.1, 2.10, 2.3	• maintain, operate, and repair facilities and equipment.
1.1, 2..3, 2.4	• apply safety regulations and practices.
1.11,2.13,2.18	• maintain records on a supervised agricultural experience program and be able
1.12,2.16,2.37	• to summarize and analyze results in making financial decisions.
	• utilize activities of FFA as an integral component of course content and leadership development.
1.9, 1.10, 1.12	• apply science, math and communication skills within the technical content.

Connections

- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- National Council for Agriculture Education Skill Standards in Bio-Technology

Agricultural Business / Farm Management

Course Description: This course introduces the free enterprise system, the study of economic principles, risk management, business law, budgets, finance, recordkeeping, and careers in agribusiness. Basic skills will be developed to manage a farm or agribusiness. Material will include: managing production/inventory, equipment, credit and taxes, market analysis and developing a business/farm plan. Content may be enhanced with appropriate computer applications. Leadership development will be provided through FFA. Each student will be expected to have a supervised agricultural experience program.

Academic Expectations	Content/Process
	Students will
1.1, 2.36, 2.38	• demonstrate employability and social skills relative to the career cluster.
2.18, 2.30,5.1	• relate economic principles to agribusiness/farm management.
1.12, 2.7, 2.8	• evaluate record keeping systems and procedures in agribusiness or farming.
1.1, 2.18,6.1	• investigate sources of capital for agriculture.
2.37, 5.5, 6.1	• relate government policies and business law to agriculture.
1.1, 2.37, 5.1	• identify agribusiness functions critical to success with minimizing risk.
2.11, 5.5, 5.5	• prepare budgets determining financial needs, costs, and loan repayments.
2.7, 2.8, 2.12	• analyze inventories to asset values, net worth, efficiency and production.
2.2, 5.1, 6.2	• explore marketing options available to agricultural products.
2.18, 2.37, 5.1	• plan marketing strategies for agriculture products.
2.37, 5.4, 5.5	• manage human resources in agriculture.
1.1, 1.6, 2.37	• discuss GPS (global positioning systems) and their influence on agriculture.
1.11,2.13,2.18	• maintain records on a supervised agricultural experience program and be able to summarize and analyze results in making financial decisions.
1.12,2.16,2.37	• utilize activities of FFA as an integral component of course content and leadership development.
1.9, 1.10, 1.12	• apply science, math and communication skills within the technical content.

Connections

- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- National Council for Agriculture Education Skill Standards in Bio-Technology

Agricultural Employability Skills

Course Description: Agricultural employability skills provides opportunities to develop skills in: job searching, preparing resumes, writing letters of application, job interviews, attitude at work, communicating effectively, human relations and accepting responsibilities. Content may be enhanced with appropriate computer applications. Leadership development will be provided through FFA. Each student will be expected to have a supervised agricultural experience program.

Academic Expectations	Content/Process
	Students will
1.1, 2.36, 2.38	• demonstrate employability and social skills relative to the career cluster.
2.37, 2.18, 5.2	• recommend Entrepreneurship and business training opportunities for agriculture to the community.
2.30, 5.4, 2.37	• compare agricultural business organizations and regulations.
2.17, 2.37, 5.4	• practice interpersonal relationships and communications.
2.37,2.38,2.17	• improve individual and group management skills.
2.37, 5.1, 5.4	• manage records and information systems for agriculture.
2.37,2.18,2.30	• manage capital resources for agriculture.
2.37, 2.16, 6.2	• investigate employer/employee responsibility.
1.16, 2.37, 5.1	• apply technology in agricultural employment industry.
1.11,2.13,2.18	• maintain records on supervised agricultural experience program and be able to summarize and analyze results in making financial decisions.
1.12,2.16,2.37	• utilize activities of FFA as an integral component of course content and leadership development.
1.9, 1.10, 1.12	• apply science, math and communication skills within the technical content.

Connections

- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)

Agricultural Sales and Marketing

Course Description: This course provides an introduction to agricultural sales and marketing, including. Course material will include: competition in the agriculture market place, marketing decisions, types of markets, contracting, government programs and regulations, personal development, employee and employer responsibilities, communications, promotion strategies, records, files, purchasing materials, stocking, selling and business account procedures. Content may be enhanced with appropriate computer applications. Leadership development will be provided through FFA. Each student will be expected to have a supervised agricultural experience program.

Academic Expectations	Content/Process
	Students will
1.1, 2.36, 2.38	• demonstrate employability and social skills relative to the career cluster.
2.16, 2.37	• relate interpersonal skills to success in agricultural sales and marketing.
1.4, 2.17, 2.37	• demonstrate effective verbal and written communications skills in agricultural sales and marketing.
2.37, 5.5, 6.1	• dramatize effective salesmanship techniques in agricultural sales and marketing.
1.16,2.37,5.4	• advertise and promote agricultural products.
2.2, 5.1, 6.2	• explore marketing options for agricultural products.
5.1, 2.37, 6.1	• utilize agricultural business procedures and record keeping.
2.18, 2.37, 5.1	• formulate a marketing plan for agricultural products.
1.16, 2.37	• utilize technology in agricultural sales and marketing.
1.11,2.13,2.18	• maintain records on a supervised agricultural experience program and be able to summarize and analyze results in making financial decisions.
1.12,2.16,2.37	• utilize activities of FFA as an integral component of course content and leadership development.
1.9, 1.10, 1.12	• apply science, math and communication skills within the technical content.

Connections

- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)

Agricultural Bio-Technology

Course Description: Biotechnology in agriculture is designed to emphasize the interrelationship of science and technology and the impact of this technology on agriculture and agricultural products. The curriculum includes: career opportunities in the agricultural biotechnology industry; basic concepts about biotechnology; how genetic information is transferred and changed by engineering; opportunities, impacts and public issues concerning biotechnology; the processes and applications of biotechnology in plant and animal science; and the applications of microbial biotechnology in agriculture. Content will be enhanced with appropriate applied science laboratory activities and computer applications. Leadership development will be provided through FFA. Each student will be expected to have a supervised agricultural experience program.

Academic Expectations	Content/Process
	Students will
1.1, 2.36, 2.38	• demonstrate employability and social skills relative to the career cluster.
1.16, 2.7, 2.8	• investigate basic concepts about biotechnology in agriculture.
2.4, 2.13, 2.2	• analyze how genetic information is transferred and changed.
2.1,2.16, 2.18	• debate opportunities, impacts, and public issues concerning biotechnology.
1.10, 5.1, 5.3	• investigate the processes and applications of biotechnology in plant science.
1.10, 5.1, 5.3	• investigate the processes and applications of biotechnology in animal science.
1.10, 5.1, 5.3	• investigate the applications of microbial biotechnology in agriculture.
1.11,2.13,2.18	• maintain records on a supervised agricultural experience programs and be able to summarize and analyze results in making financial decisions.
1.12,2.16,2.37	• utilize activities of FFA as an integral component of course content and leadership development.
1.9, 1.10, 1.12	• apply science, math and communication skills within the technical content.

Connections

- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- National Council for Agriculture Education Skill Standards in Bio-Technology

Agricultural Communications

Course Description: This course develops an understanding of fundamental skills necessary to be successful in the agricultural communications industry. Provides guided practice and applied experience utilizing various styles of communication including oral, written, and electronic communications. Techniques of communications will include: traditional print media, brochure development, photography, videography, computer program applications, and Internet usage including e-mail. Leadership development will be provided through FFA. Each student will be expected to have a supervised agricultural experience program.

Academic Expectations	Content/Process
	Students will
1.1, 2.36, 2.38	• demonstrate employability and social skills relative to the career cluster.
1.12	• develop skills in public, extemporaneous and impromptu speaking.
5.4, 2.16	• communicate to resolve conflict and promote team building.
1.16	• perform computer skills related to word processing, desktop publishing, multimedia presentations and computer graphics.
2.37	• develop skills related to proper telephone usage.
1.11	• develop skills to produce print quality newspaper and magazine articles.
2.22,1.16	• develop skills to produce brochures and sale ads.
1.13	• develop skills for photography and videography used in communications.
1.12	• utilize skills developed to produce radio and television ads/promotions.
1.16	• develop skills needed to produce multimedia presentations.
1.16	• utilize the Internet for research, E-mail, and basic communication processes.
1.15, 2.16	• understand how non-verbal communication plays a part in interpersonal development.
1.10,2.30	• conduct meetings by using parliamentary procedure.
2.38	• learn to develop and complete professional quality resumes.
2.38	• learn techniques to assist in applying and interviewing for a job.
1.1, 2.30	• demonstrate the ability to do market research and organization for presentations.
1.11, 2.37	• plan, organize and deliver a sales presentation.
1.11,2.13,2.18	• maintain records on supervised agricultural experience program and be able to summarize and analyze results in making financial decisions.
1.12,2.16,2.37	• utilize activities of FFA as an integral component of course content and leadership development.
1.9, 1.10, 1.12	• apply science, math and communication skills within the technical content.

Connections

- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)

Aquaculture

Course Description: This course is an introduction to aquacultural science. Instruction provides the fundamentals of aquatic plant and animal biology, anatomy/morphology and physiology in aquaculture, and the unique properties of water for aquaculture. Instruction also includes fish and aquatic crop production principles, management and marketing. Applications of biotechnology in aquaculture, and aquaculture as sustainable agriculture is also included. Content will be enhanced with appropriate applied scientific laboratory activities and computer applications. Leadership development will be provided through FFA. Each student will be expected to have a supervised agricultural experience program.

Academic Expectations	Content/Process
	Students will
1.1, 2.36, 2.38	• demonstrate employability and social skills relative to the career cluster.
2.3, 2.4	• relate the fundamentals of aquatic plant and animal biology to production
2.10, 5.5, 6.3	• analyze the unique chemical properties of water for aquaculture.
2.13, 5.1	• demonstrate principles of aquacrop production from species selection to seed production to harvesting to processing.
2.2, 2.18, 5.2	• describe the components of managing the aquafarm and the marketing of aquacrops.
6.1, 2.6	• determine applications of biotechnology in aquaculture.
2.20, 2.19	• evaluate aquaculture as sustainable agriculture.
1.11,2.13,2.18	• maintain records on a supervised agricultural experience program and be able to summarize and analyze results in making financial decisions.
1.12,2.16,2.37	• utilize activities of FFA as an integral component of course content and leadership development.
1.9, 1.10, 1.12	• apply science, math and communication skills within the technical content.

Connections

- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- National Council for Agriculture Education Skill Standards in Bio-Technology

Environmental Technology

Course Description: This course is an intermediate scientific study of environmental technology. It is designed to develop an awareness of environmental concerns related to air, water, soil, land use management, waste management, and their interrelationship with the biological ecosystem. Soil formation, conservation and evaluation material will also be included. Content will be enhanced with appropriate computer applications, scientific laboratory activities, field experimentation, community development projects, and occupational development. Leadership development will be provided through FFA. Each student will be expected to have an agricultural experience program.

Academic Expectations	Content/Process
	Students will
1.1, 2.36, 2.38	• demonstrate employability and social skills relative to the career cluster.
2.19, 2.2, 2.5	• distinguish the importance of conserving and managing our natural resources to maintain a high standard of living.
2.19, 2.2, 2.5	• investigate the various types of ecosystems and management skills for a productive life cycle.
2.1, 2.19, 2.20	• relate the physical properties of soil and its effect to the different aspects of the environment.
2.1, 5.4, 6.1	• relate environmental issues to the management of waste products.
2.15,2.14,5.1	• investigate the effects of land use and environmental legislation in multiple use planning.
2.15,2.30,2.18	• relate the proper handling, application and disposal of chemicals to protection of the environmental balance.
2.13, 2.1, 4.4	• analyze the importance of air and water quality on society to ensure and improve sustainable standards.
1.11,2.13,2.18	• maintain records on a supervised agricultural experience program and be able to summarize and analyze results in making financial decisions.
1.12,2.16,2.37	• utilize activities of FFA as an integral component of course content and leadership development.
1.9, 1.10, 1.12	• apply science, math and communication skills within the technical content.

Connections

- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- National Council for Agriculture Education Skill Standards in Bio-Technology

Food Technology

Course Description: Food Technology introduces the issues of world food production and the preparing, processing, and packaging of food. The government regulations regarding foods and the exploration of career opportunities will also be covered. Content may be enhanced with appropriate computer applications. Leadership development will be provided through FFA. Each student will be expected to have a supervised agricultural experience program.

Academic Expectations	Content/Process
	Students will
1.1, 2.36, 2.38	• demonstrate employability and social skills relative to the career cluster.
2.15, 2.16, 2.20	• determine trends in world and U. S. food production.
2.18, 2.30, 2.31	• relate the food industry to the consumer, including food labeling and economics.
2.1,2.3, 2.4,2.6	• investigate food safety issues from farm to retail, including microbial problems, risk assessment, food handling and HAACP concepts.
2.29,2.3,2.10	• compare nutrient components of different food products and their effects on consumer's health.
2.3, 2.9,2.8, 2.7	• construct processing, inspection, fabrication, preserving, storing and marketing aspects of the meat industry.
2.18, 2.30, 5.1	• identify the wholesale and retail cuts of the meat animal carcass.
2.30, 5.1, 2.18	• investigate the egg industry from grading to marketing.
2.30, 5.1, 2.18	• investigate production methods and marketing of dairy products.
2.30, 5.1, 2.18	• compare processing and marketing of small grains products, fruits, and vegetables.
1.11, 2.13, 2.18	• maintain records on a supervised agricultural experience program and be able to summarize and analyze results in making financial decisions.
1.12, 2.16, 2.37	• utilize activities of FFA as an integral component of course content and leadership development.
1.9, 1.10, 1.12	• apply science, math and communication skills within the technical content.

Connections

- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- National Council for Agriculture Education Skill Standards in Bio-Technology

Forestry

Course Description: This course introduces the science of silviculture. The course includes career opportunities, tree identification, tree production, forestry management, timber harvesting, wood utilization and the environmental and ecological aspects of forestry. Content may be enhanced with appropriate computer applications. Leadership development will be provided through FFA. Each student will be expected to have a supervised agricultural experience program.

Academic Expectations	Content/Process
	Students will
1.1, 2.36, 2.38	• demonstrate employability and social skills relative to the career cluster.
1.1, 2.31, 2.3	• utilize forestry tools and equipment.
1.1, 1.16,1.3 1.9	• survey land and cruise timber .
1.1,1.2,1.10, 2.1	• investigate physical characteristics of trees, plant processes, growth and taxonomy.
1.1, 1.2, 1.3, 2.1	• recommend management practices including: genetic potential, reforestation, timber stand improvement, and harvesting.
1.1, 1.2, 1.3, 2.1	• investigate environmental, social , and economic value of forest.
1.1,1.2,1.3,1.16	• investigate the influence/importance of forestry from local to global level..
1.1,1.2,1.3,1.10	• distinguish wood characteristics including wood properties, products, wood identification and physiology.
1.1, 1.2, 1.3, 2.1	• evaluate methods for forest protection from insect, disease and other destructive agents.
1.11,2.13,2.18	• maintain records on a supervised agricultural experience program and be able to summarize and analyze results in making financial decisions.
1.12, 2.16, 2.37	• utilize activities of FFA as an integral component of course content and leadership development.
1.9, 1.10, 1.12	• apply science, math and communication skills within the technical content.

Connections

- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- National Council for Agriculture Education Skill Standards in Bio-Technology

Small and Specialty Animal Technology

Course Description: This course develops scientific knowledge, management practices, and marketing strategies in small and specialty animal technology. The curriculum includes identification, anatomy, physiology, nutrition, health, selection and care of small animals such as dogs, cats, rabbits, companion birds, ostriches, emus, tropical fish, and fur bearers. Content will be enhanced with appropriate applied scientific laboratory activities and computer applications. Leadership development will be provided through FFA. Each student will be expected to have a supervised agricultural experience program.

Academic Expectations	Content/Process
	Students will
1.1, 2.36, 2.38	• demonstrate employability and social skills relative to the career cluster.
1.6, 2.9, 2.17	• relate small animal technology to current world trends.
2.3, 2.6,2.20	• describe the distinguishing characteristics of the different breeds of small and specialty animal species.
2.1, 2.3	• describe and compare the physiology and anatomy of small animal species.
2.2, 2.5, 2.6	• describe and compare the process of reproduction of small animal species.
2.1,2.2,2.3,5.3	• analyze the nutritional requirements of small and specialty animal species.
2.33, 2.8, 2.10	• describe the care, handling, sheltering, and grooming of small animals.
2.4, 2.6	• investigate diseases and plan a health maintenance schedule in small animals.
2.2, 2.18, 5.2	• evaluate the management and marketing of small animal services and products.
1.11,2.13,2.18	• maintain records on a supervised agricultural experience program and be able to summarize and analyze results in making financial decisions.
1.12,2.16,2.37	• utilize activities of FFA as an integral component of course content and leadership development.
1.9, 1.10, 1.12	• apply science, math and communication skills within the technical content.

Connections

- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- National Council for Agriculture Education Skill Standards in Bio-Technology

Wildlife Resources

Course Description: Develops an awareness of wildlife industry resources. The course includes: a study of ecology and ecosystems, wildlife habitat, population dynamics ,management technics that deal with wildlife in all areas and the regulations that effect the wildlife industry. Content may be enhanced with appropriate applied scientific laboratory activities and computer applications. Leadership development will be provided through FFA. Each student will be expected to have a supervised agricultural experience program.

Academic Expectations	Content/Process
	Students will
1.1,2.36,2.38	• demonstrate employability and social skills relative to the career cluster.
2.2,2.3,2.4,2.5	• analyze the dynamics of an ecosystem.
2.2,2.3,2.4,2.5	• examine the diverse components of habitat and it's relation to wildlife.
2.1,2.9, 2.11	• calculate the population dynamics that relate to wildlife.
2.14,2.18,2.20	• identify the human role in wildlife and habitat management as it applies to historic, social, political, and economic concerns.
2.2, 2.3, 2.5	• examine the human impact on wildlife resources.
2.14,1.10,1.11	• examine the Federal and State Laws and Regulation that pertain the conservation and preservation of wildlife.
1.11,2.13,2.18	• maintain records on a supervised agricultural experience program and be able to summarize and analyze results in making financial decisions.
1.12,2.16,2.37	• utilize activities of FFA as an integral component of course content and leadership development.
1.9, 1.10, 1.12	• apply science, math and communication skills within the technical content.

Connections

- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- National Council for Agriculture Education Skill Standards in Bio-Technology

Advanced Wildlife Management

Course Description: A freshman-level college course which provides students with an overview of wildlife ecology and management. Emphasis is placed on the multifaceted nature of wildlife ecology, the importance of wildlife in our culture, and the relationships among wildlife and other natural resources. Opportunity will be provided for students to earn three (3) hours of introductory college credit. Content may be enhanced by appropriate computer applications. Leadership development will be provided through FFA. Student agricultural experience programs will enhance program benefits.

Academic Expectations	Content/Process
	Students will
1.1, 2.36, 2.38	• demonstrate employability and social skills relative to the career cluster.
2.2, 2.6	• define wildlife and the wildlife management process.
2.20	• recount the history and legislation as it relates to wildlife and endangered species.
2.5, 2.6	• interpret the basic ecological principles and their related habitat requirements for different wildlife species.
2.1, 2.3	• review the agricultural, forest, and range land management practices.
2.1, 2.2	• explain wetlands, wetland ecology, and management and waterfowl management.
2.3, 2.6	• examine the attributes of population, population interaction, and abundance.
2.2, 2.4	• formulate management practices for backyard wildlife damage, wildlife harvest, and biodiversity.
1.11,2.13,2.18	• maintain records on a supervised agricultural experience program and be able to summarize and analyze results in making financial decisions.
1.12,2.16,2.37	• utilize activities of FFA as an integral component of course content and leadership development.
1.9, 1.10, 1.12	• apply science, math and communication skills within the technical content.

Connections

- Kentucky Occupational Skill Standards
- Secretary's Commission on Achieving Necessary Skills (SCANS)
- National Council for Agriculture Education Skill Standards in Bio-Technology